

CLAIM AMENDMENTS

Please amend Claims 1-5, 7, 8, 15-18, 21, 27, and 52 as follows.

1. (Currently Amended) An image pick-up apparatus comprising:

a plurality of ~~pixels, each pixel including a photoelectric conversion element~~ elements and a switching ~~element, elements~~ element arranged on an insulating ~~a~~ substrate;

a wavelength converter positioned and configured to convert incident radiation to light having a wavelength detectable by ~~at least one of the~~ said photoelectric conversion elements;

a protective layer arranged on the insulating said substrate so as to cover the plurality of ~~pixels~~ said photoelectric conversion elements and said switching elements; and

a flattening ~~an additional~~ layer, arranged at least on the plurality of pixels so as to be positioned upon on a surface of the protective layer;

wherein a material of said additional layer is different from that of said protection layer;

wherein a surface of the additional layer is flatter than the surface of the protection layer; and

wherein the wavelength converter is arranged by being deposited on the flattening layer and comprises a columnar crystal scintillator which comprises a columnar crystal, and deposited on a flat surface of said additional layer

wherein the plurality of pixels, the protective layer, and the flattening layer are situated between the insulating substrate and the wavelength converter.

2. (Currently Amended) An image pick-up apparatus according to Claim 1, wherein the ~~flattening additional~~ layer is obtained by flattening the protective layer provided on the ~~insulating~~ substrate.

3. (Currently Amended) An image pick-up apparatus according to Claim 1, wherein the ~~flattening additional~~ layer comprises a polyimide resin.

4. (Currently Amended) An image pick-up apparatus according to Claim 1, wherein a second ~~flattening additional~~ layer is provided on the wavelength converter.

5. (Currently Amended) An image pick-up apparatus according to Claim 4, wherein the second ~~flattening additional~~ layer covers the end face of the wavelength converter.

6. (Original) An image pick-up apparatus according to Claim 1, wherein the surface of the wavelength converter is flattened.

7. (Currently Amended) An image pick-up apparatus according to Claim 4, wherein a light reflection film is provided on the second ~~flattening additional~~ layer.

8. (Currently Amended) An image pick-up apparatus according to Claim 6, wherein a light reflection film is provided on the ~~flattened~~ wavelength converter.

9. - 10. (Cancelled)

11. (Previously Presented) An image pick-up apparatus according to Claim 1, wherein the scintillator comprises a CsI crystal.

12. (Original) An image pick-up apparatus according to Claim 7, wherein the light reflection film is made of an aluminum film.

13. (Original) An image pick-up apparatus according to Claim 8, wherein the light reflection film is made of an aluminum film.

14. (Original) An image pick-up apparatus according to Claim 8, having plural insulating substrates.

15. (Currently Amended) An image pick-up apparatus comprising:
comprising:
a plurality of insulating substrates arranged on a substrate;
a plurality of pixels, each pixel including a photoelectric conversion element elements and a switching-element elements, arranged on each of the insulating substrates;
a wavelength converter configured and positioned to convert incident radiation to light having a wavelength detectable by at least one of the photoelectric conversion elements;

a protective layer arranged on at least one of the insulating substrates so as to cover the plurality of pixels on the at least one insulating substrate the photoelectric conversion elements and the switching elements; and

a flattening an additional layer arranged at least on the plurality of pixels on which the protective layer is arranged so as to be positioned upon on a surface of the protective layer, wherein a material of the additional layer is different from that of the photoelectric layer,

wherein a surface of the additional layer is flatter than the surface of the protective layer, and

wherein the wavelength converter is arranged by being deposited on the flattening layer and comprises a columnar crystal scintillator which comprises a columnar crystal, and deposited on a flat a surface of the additional layer

wherein the plurality of pixels on the at least one insulating substrate, the protective layer, and the flattening layer are situated between the insulating substrate and the wavelength converter.

16. (Currently Amended) An image pick-up apparatus according to Claim 15, wherein the flattening additional layer is obtained by flattening the protective layer provided on the insulating substrate.

17. (Currently Amended) An image pick-up apparatus according to Claim 15, wherein the flattening additional layer comprises a polyimide resin.

18. (Currently Amended) An image pick-up apparatus according to Claim 15, wherein the flattening additional layer is arranged on the plurality of insulating substrates.

19-20. (Cancelled)

21. (Previously Presented) An image pick-up apparatus according to Claim 15, wherein the scintillator comprises a CsI crystal.

22. (Cancelled)

23. (Currently Amended) An image pick-up system comprising:
an image pick-up apparatus including: a plurality of pixels, each pixel producing a signal and including a photoelectric conversion element elements and a switching element elements arranged on an insulating a substrate; a wavelength converter configured and positioned to convert incident radiation to light having a wavelength detectable by at least one of the photoelectric conversion elements; a protective layer arranged on the insulating substrate so as to cover the plurality of pixels photoelectric conversion elements and the switching elements; and a flattening an additional layer arranged at least on the plurality of pixels so as to be positioned upon on a surface of the protective layer;

wherein material of said additional layer is different from that of the protective layer,
wherein a surface of the additional layer is flatter than the surface of the protective
layer, and

wherein the wavelength converter is arranged by being deposited on the flattening
layer and comprises a columnar crystal scintillator which comprises a columnar crystal, deposited
on a flat surface of the additional layer;

wherein the plurality of pixels, the protective layer, and the flattening layer are situated
between the insulating substrate and the wavelength converter;

a signal processor configured to process the signal from the image pick-up apparatus;
and

a display configured to display the processed signal from the signal processor.

24. (Previously Presented) An image pick-up system according to Claim 23, further comprising a telecommunication device configured to transfer the signal from the signal processor.

25. (Previously Presented) An image pick-up apparatus system to Claim 23, further comprising a recorder configured to record the signal from the signal processor.

26. (Previously Presented) An image pick-up system according to Claim 23, further comprising a storage device configured to store the signal from the signal processor.

27. (Currently Amended) An image pick-up system comprising:

a plurality of insulating substrates arranged on a substrate; a plurality of pixels, each pixel producing a signal and including a photoelectric conversion element elements and a switching element elements, arranged on each of the insulating substrates; a wavelength converter configured and positioned to convert incident radiation to light having a wavelength detectable by at least one of the photoelectric conversion elements; a protective layer arranged on at least one of the insulating substrates so as to cover the plurality of pixels on the at least one insulating substrate photoelectric conversion elements and switching elements; and a flattening an additional layer arranged at least on the plurality of pixels on which the protective layer is arranged so to be positioned upon on a surface of the protective layer;

wherein material of said additional layer is different from that of the protective layer,

wherein a surface of the additional layer is flatter from the surface of the protective layer, and

wherein the wavelength converter is arranged by being deposited on the flattening layer and comprises a columnar crystal scintillator which comprises a columnar crystal, and deposited on a flat surface of the additional layer;

wherein the plurality of pixels on the at least one insulating layer, the protective layer, and the flattening layer are situated between the insulating substrate and the wavelength converter;

a signal processor configured to process the signal from the image pick-up apparatus; and

a display configured to display the processed signal from the signal processing means.

28. (Previously Presented) An image pick-up system according to Claim 27, further comprising a recorder configured to record the processed signal from the signal processor .

29. (Previously Presented) An image pick-up system according to Claim 27, further comprising a telecommunication device configured to transfer the signal from the signal processor.

30. (Previously Presented) An image pick-up system according to Claim 27, further comprising a storage device configured to store the signal from the signal processor.

31.-51. (Canceled)

52. (Currently Amended) An image pick-up apparatus comprising:
a plurality of pixels, each pixel including a photoelectric conversion element elements and a switching element elements, arranged on an insulating a substrate;
a wavelength converter configured and positioned to convert incident radiation to light having a wavelength detectable by at least one of the photoelectric conversion elements;
a protective layer arranged on the insulating substrate so as to cover the plurality of pixels photoelectric conversion elements and switching elements; and
a flattening an additional layer arranged at least on the plurality of pixels so as to be positioned upon on a surface of the protective layer;
wherein material of said additional layer is different from that of the protective layer.

wherein a surface of the additional layer is flatter than the surface of the protective layer,

wherein the wavelength converter is arranged by being deposited on the flattening layer and comprises a columnar crystal scintillator which comprises a columnar crystal deposited on a flat surface of the additional layer, and

wherein the plurality of pixels, the protective layer, and the flattening layer are situated between the insulating substrate and wavelength converter, and

wherein the photoelectric conversion elements comprise non-crystalline semiconductor material.

53. (Previously Presented) The image pick-up apparatus according to Claim 52, wherein the photoelectric conversion elements comprise an amorphous silicon film.